



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A01L 1/02, 3/02		A1	(11) International Publication Number: WO 99/08512
			(43) International Publication Date: 25 February 1999 (25.02.99)
<p>(21) International Application Number: PCT/AU98/00662</p> <p>(22) International Filing Date: 20 August 1998 (20.08.98)</p> <p>(30) Priority Data: PO 8676 20 August 1997 (20.08.97) AU</p> <p>(71)(72) Applicant and Inventor: PITTARD, John [AU/AU]; 1 Bourkes Creek Road, Pakenham Upper, VIC 3810 (AU).</p> <p>(74) Agents: HUNTSMAN, Peter, H. et al.; Davies Collison Cave, 1 Little Collins Street, Melbourne, VIC 3000 (AU).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>	
<p>(54) Title: A HORSESHOE</p> <p>(57) Abstract</p> <p>A horseshoe (10) comprising a toe portion (12), two spaced heel portions (16), and two side portions (14) each extending between the toe portion (12) and a respective one of the heel portions (16), said toe portion (12), heel portions (16) and side portions (14) being adapted to underlie the toe, heels and sides, respectively, of the wall of a horse's hoof, the horseshoe (10) further comprising a frog portion (20) adapted to underlie and support the frog of the hoof and is supported independently of the heel portions (16) by support means (18) extending from the toe portion (12). An opening (24) through the horseshoe may be provided between the toe portion (12) and the frog portion (20) to underlie the sole of the hoof, with two support members (18) of the support means extending on respective sides of the opening. The leading portion of the toe portion (12) between the support members (18) may be omitted.</p>			

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- 1 -

A HORSESHOE

The present invention relates to horseshoes and is particularly, but not only, concerned with a therapeutic horseshoe.

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The frog of a horse's hoof acts as a shock absorber as the hoof engages the ground, and the pressurizing of the frog provides a hydraulic force which helps to push the blood in the leg adjacent the hoof back up the leg.

10 It has been known to provide a frog support in a horseshoe so that as the hoof engages the ground through the horseshoe, the frog engages the frog support rather than the ground. This can protect the frog and improve the hydraulic action provided by the frog. However, I have found that the engagement of a frog support with the remainder of the horseshoe can restrict the overall performance of the shoe and therefore of the hoof.

15

Australian Patent Specification AU-A-68906/91 discloses a horseshoe in which the interior has been filled-in except for openings adjacent respective side portions of the shoe. A frog support is defined between the heel portions of the horseshoe and is supported by the heel portions as well as by a longitudinal portion extending from the toe portion of the shoe.

20

In Australian Design Registration AU-S-69042, the frog portion is supported only by the heel portions of the horseshoe. Similarly, in Australian Design Registration AU-S-89105, a horseshoe is disclosed having a frog portion supported by both the heel portions and the side portions of the shoe. In Australian Design Registration AU-S-97881, a horseshoe having a 25 continuous base is disclosed.

In all of the above prior proposals, the engagement of the frog portion with the remainder of the horseshoe means that the horseshoe is rigid across its heel portions. However, as a horse's hoof engages the ground the hoof spreads laterally. In particular, the heels of the 30 hoof, that is the rearwardsmost portions of the wall of the hoof, spread outwardly away from

- 2 -

each other. This spreading action is permitted by the usual C-shaped horseshoe but not by the above prior proposals. Preventing the hoof from spreading as it engages the ground tends to cause the wall of the hoof to crack.

- 5 It is an object of the present invention to alleviate the aforementioned disadvantages of the above prior proposals.

According to the present invention there is provided a horseshoe comprising a toe portion, two spaced heel portions, and two side portions each extending between the toe portion and 10 a respective one of the heel portions, said toe portion, heel portions and side portions being adapted to underlie the toe, heels and sides, respectively, of the wall of a horse's hoof, the horseshoe further comprising a frog portion adapted to underlie and support the frog of the hoof, wherein said frog portion is supported independently of the heel portions by support means extending from the toe portion.

15

By the present invention, the heel portions are not held rigidly by the frog portion and are free to move with a change in shape of the hoof. Furthermore, the frog portion is supported by the strongest part of the horse's hoof, the toe portion. It has been found by use of the invention that not only is cracking of the horse's hoof alleviated but also that growth of the 20 frog is promoted.

The required movement of the horseshoe to accommodate the spreading of the hoof is not large and should be permitted by any of the materials from which horseshoes are normally made, including steel, aluminium, aluminium alloys, other alloys, and plastics. The material 25 may be forged, cast or otherwise moulded. The formed horseshoe may be heat treated or otherwise aged and/or surface treated to give the desired properties. In a preferred embodiment, the horseshoe is forged from aluminium alloy. In another embodiment the horseshoe may be die-cast from aluminium alloy. The formed alloy may be heat treated to age the alloy and shot and/or sand blasted to smooth the surface.

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- 3 -

Advantageously, the horseshoe has a flat upper surface for engagement with the horse's hoof and is of substantially constant thickness except for grooves and/or openings in the toe portion, side portions and/or heel portions for accommodating the heads of fasteners used to secure the horseshoe to the hoof. The openings for the fasteners may be formed during manufacture of the horseshoe or subsequently, for example as the horseshoe is being prepared to be secured to the hoof.

For a front hoof, the frog portion may extend rearwardly substantially to an imaginary curved line continuing or joining the curves of the side portions through the heel portions, so as to underlie the rearwardmost portion of the frog. The rear edge of the frog portion may be concave so as to substantially follow the contour of that portion of the frog. For a rear hoof, the frog portion may be extended beyond the aforementioned imaginary curve to assist in preventing the horse from dropping the rear portion of the hoof and "getting down on its bumpers".

15

The support means for the frog portion may extend rearwardly from the toe portion as a single member. However, preferably, an opening through the thickness of the horseshoe is provided on the longitudinal axis of the shoe between the toe portion, or the line of the toe portion, and the frog portion to accommodate the corresponding portion of the sole of the hoof. In this case the frog portion support means may comprise a member extending from the frog portion to the opening and two arms extending forwardly around the opening from said member to the toe portion. Preferably however the opening extends from the toe portion, on the line of the toe portion, to the frog portion and the support means comprises two elongate support members extending from the toe portion to the frog portion, spaced apart to define the aforementioned opening therebetween.

For the front hoof, the toe portion advantageously has a leading lower edge which is bevelled to provide an easy break for the hoof from the ground. Alternatively, in a preferred embodiment, the frog portion support means engages the toe portion at two spaced locations on respective sides of the longitudinal axis of the horseshoe, and the toe portion is

- 4 -

discontinuous between said two locations. Thus, all or part of the toe portion between the aforementioned two support members or between the aforementioned bifurcated arms of the single support member may be omitted in part or altogether. In this arrangement the horseshoe may be substantially W-shaped with the toe portion at the bottom. By the term 5 "the line of the toe portion" as used herein is meant the line or curve that the omitted portion of the toe portion would follow.

Various embodiments of a horseshoe in accordance with the present invention will now be described by way of example only with reference to the accompanying drawings, in which:

- 10 Figure 1 is a plan view from below of one embodiment of the horseshoe;
Figure 2 is a front elevational view of the horseshoe of Figure 1;
Figures 3 to 7, 9 and 12 to 24 are plan views from above of respective alternative embodiments of the horseshoe shown in Figures 1 and 2;
Figure 8 is a side elevational view of the embodiment of horseshoe shown in Figure
15 7; and
Figures 10 and 11 are, respectively, front and side elevational view of the embodiment of horseshoe shown in Figure 9.

For convenience the same reference numerals have been used for the same or similar parts
20 in the different embodiments of the horseshoe.

The horseshoe 10 in Figures 1 and 2 is formed in aluminium alloy, for example by forging in a 2000, 6000 or 7000 series alloy, which may then be heat treated or otherwise aged, and sand or shot blasted to smooth the surface. The shoe 10 has a substantially constant thickness 25 except at its peripheral edges which are bevelled and at grooves 11 in the lower face shown in Figure 1 to accommodate the heads of horseshoe nails (not shown) for fixing the shoe to a hoof. Holes for the nails may be preformed through the shoe, but are usually drilled on site. The upper face of the horseshoe is flat.

30 The bevelling of the edge faces is such as to increase the included angle between the edge

- 5 -

faces and the lower face of the shoe to greater than a right angle. The bevelling may be through part or all of the thickness of the horseshoe and may form one or more chamfered faces through the thickness. As seen in Figure 2, the bevelling may vary around the periphery of the horseshoe.

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The horseshoe 10 is for a front hoof and comprises a toe portion 12 and opposed curved side portions 14 extending to respective heel portions 16. The side portions 14 are curved to the shape of the corresponding portion of the wall of a horse's hoof and the heel portions 16 underlie the heels of the hoof.

10

Extending rearwardly from the toe portion 12 are substantially parallel elongate support members 18 which extend to a frog portion 20 between and spaced from the heel portions 16 to underlie the frog of the hoof. The frog portion 20 has a concave rear face 22 to substantially follow the contour of the rear portion of the frog. The rear face 22 lies 15 substantially on an imaginary curved line continuing the curve of the outer periphery of the side portions 14 through the heel portions 16.

The grooves 11 for accommodating the heads of the horseshoe nails are provided in the toe portion 12 and side portions 14 so that the horseshoe is secured to the hoof through those 20 portions, but not through the frog portion 20 or support members 18. Two opposed grooves 11 are shown, but each of the grooves 11 may be divided into a greater number of shorter grooves.

An opening 24 through the thickness of the horseshoe 10 is defined between the support 25 members 18, particularly to accommodate the lower portion of the sole behind the toe of the hoof. As shown, the part of the toe portion 12 between the support members 18 ahead of the opening 24 is omitted since this part is unnecessary. Omitting this part of the toe portion 12 from the horseshoe for a front hoof allows the hoof to have a clean break from the ground.

30 The feature of the clean break is not necessary in a horseshoe for a rear hoof, but in such a

- 6 -

shoe the frog portion 20 may be extended rearwardly by about 5 to 20 mm to prevent the rear of the hoof from dropping and the horse getting down on its bumpers.

The horseshoe 10 ensures that the heel portions 16 are not constrained laterally by the frog portion 20 and are therefore free to move outwardly away from each other as the hoof engages the ground. Furthermore, the frog portion 20 is supported from the strongest part of the horse's hoof, the toe of the hoof wall.

In Figures 3 to 24, the same basic shape of horseshoe is shown to the horseshoe 10 of Figures 10 1 and 2, and for convenience only the modifications will be described. It will be appreciated that in general terms any one of the modifications illustrated may be applied to any other embodiment illustrated to provide horseshoes having combinations of modifications other than those illustrated.

15 The horseshoe 26 in Figure 3 is for a rear hoof and the frog portion 20 is extended rearwardly by about 10 cm compared to the frog portion of the horseshoe 10 to alleviate the horse going down on its bumpers.

In the horseshoe 30 of Figure 4, the respective support members 18 are shortened compared 20 to those of the horseshoe 10 and comprise bifurcated arms projecting forwardly from a solid support portion 32 of corresponding width to and an extension of the frog portion 20 to define an opening 24 of substantially reduced size rearwardly of the line of the toe portion. The horseshoe 30 is for a front hoof.

25 The horseshoe 40 in Figure 5 is for a rear hoof, but is otherwise similar to the horseshoe 30. The frog portion 20 is extended rearwardly as discussed above, and the horseshoe is generally wider than the horseshoe 30. The frog portion 20 and solid support portion 32 are both wider than in the horseshoe 30 so as to reduce the size of the openings 42 between the support portion 32/support members 18 and the side portions 14. The reduced length opening 24 is 30 also wider at its leading end than in the horseshoe 30 and the omitted part of the toe portion

- 7 -

12 is of correspondingly greater length.

The horseshoe 50 in Figure 6 is closely similar to the horseshoe 30, but defines a wider leading portion of the opening 24 and correspondingly longer omitted part of the toe portion
5 12.

Figures 7 and 8 are top plan and side elevational views of a horseshoe 60 for a rear hoof. The horseshoe 60 is identical to the shoe 26 of Figure 3 except that the toe portion 12 is continuous ahead of the opening 24. The leading face 62 of the toe portion is bevelled, as
10 illustrated in Figure 8.

Figures 9 to 11 are a top plan view and side and front elevational views of a horseshoe 70 which is identical to the horseshoe 60 except for the inclusion of a downwardly depending peg 72 projecting from the leading face 62 of the continuous toe portion 12 to dig into the ground.
15

The horseshoe 80 in Figure 12 is identical to the horseshoe 60 of Figures 7 and 8 except that the frog portion 20 extends further forwardly to slightly reduce the size of the opening 24.

In Figure 13, the horseshoe 90 is identical to the horseshoe 10 except that the opening 24 is
20 waisted somewhat adjacent its leading end by increasing the width of the support members
18 at 92.

The horseshoe 100 in Figure 14 is for the front hoof and is closely similar to the horseshoe 50 of Figure 6 except that the opening 24 has a reduced depth corresponding to that of the
25 opening 24 in the horseshoe 30 of Figure 4.

The horseshoe 110 in Figure 15 is identical to the horseshoe 10 of Figure 1 except that it has a wider leading end of the opening 24 and correspondingly longer omitted part of the toe portion 12. Thus, the horseshoe 110 has been "opened-out" compared to the horseshoe 10.
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- 8 -

The horseshoe 120 in Figure 16 is identical to the horseshoe 110 of Figure 15 except that the frog portion 20 has been extended rearwardly in the manner of the horseshoe 26 of Figure 3.

The horseshoe 130 in Figure 17 is identical to the horseshoe 50 in Figure 6 except that the
5 frog portion 20 has been extended rearwardly in the manner of the frog portion 20 in the
horseshoe 26 of Figure 3.

The horseshoe 140 in Figure 18 is similar to the horseshoe 30 in Figure 4, but the waisted
opening 24 is of slightly greater depth, thereby increasing the length of the support members
10 18 and correspondingly reducing the length of the solid support portion 32.

The horseshoe 150 in Figure 19 is identical to the horseshoe 110 in Figure 15, except that the
length of the side portions 14 has been reduced, requiring the support members 18 to be
opened out, with a corresponding increase in width of the leading end of the opening 24 and
15 increase in length of the omitted part of the toe portion 12.

The horseshoes 160 and 170 in Figures 20 and 21 respectively correspond to the horseshoe
150 of Figure 19 except that they have the reduced depth openings 24 of the horseshoes 100
and 50 of Figures 14 and 6 respectively to define the support portions 32 from which the
20 reduced length support members 18 extend.

The horseshoe 180 in Figure 22 corresponds to the horseshoe 150 in Figure 19 except that
the frog portion 20 has been extended rearwardly in the manner of the frog portion 20 of the
horseshoe 26 of Figure 3.

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The horseshoe 190 in Figure 23 is identical to the horseshoe 140 in Figure 18 except that the
frog portion 20 has been extended rearwardly in the manner of the frog portion 20 of the
horseshoe 26 of Figure 3.

30 The horseshoe 200 in Figure 24 is identical to the horseshoe 80 in Figure 12 except that the

- 9 -

opening 24 has been extended rearwardly so as to reduce the length of the frog portion 20.

Those skilled in the art will appreciate that the invention described herein is susceptible to variations and modifications other than those specifically described. It is to be understood 5 that the invention includes all such variations and modifications which fall within its spirit and scope.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood 10 to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

- 10 -

CLAIMS

1. A horseshoe comprising a toe portion, two spaced heel portions, and two side portions each extending between the toe portion and a respective one of the heel portions, said toe portion, heel portions and side portions being adapted to underlie the toe, heels and sides, respectively, of the wall of a horse's hoof, the horseshoe further comprising a frog portion adapted to underlie and support the frog of the hoof, wherein said frog portion is supported independently of the heel portions by support means extending from the toe portion.
- 10 2. A horseshoe according to claim 1 wherein an opening is provided through the thicknesses of the horseshoe on the longitudinal axis of the shoe between the toe portion, and the line of the toe portion, and the frog portion.
3. A horseshoe according to claim 2 wherein the support means comprises a member extending from the frog portion to the opening and two arms extending forwardly around the opening from said member to the toe portion.
4. A horseshoe according to claim 2 wherein the opening extends from the toe portion, or the line of the toe portion, to the frog portion.
- 20 5. A horseshoe according to claim 4 wherein the support means comprises two elongate support members extending from the toe portion to the frog portion, spaced apart to define the opening therebetween.
- 25 6. A horseshoe according to claim 1 wherein the support means engages the toe portion at two spaced locations on respective sides of the longitudinal axis of the horseshoe, and wherein the toe portion is discontinuous between said two locations.
7. A horseshoe according to claim 2 wherein the support means engages the toe portion at two spaced locations on respective sides of the longitudinal axis of the horseshoe, and

- 11 -

wherein the opening extends forwardly between the two spaced locations.

8. A horseshoe according to claim 1 wherein the toe portion has a leading lower edge which is bevelled.

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9. A horseshoe according to claim 1 wherein the rear edge of the frog portion is concave.

10. A horseshoe according to claim 1 wherein the frog portion extends rearwardly substantially to an imaginary curved line joining the curves of the side portions through the 10 heel portions.

11. A horseshoe according to claim 1 wherein the frog portion extends rearwardly beyond an imaginary curved line joining the curves of the side portions through the heel portions.

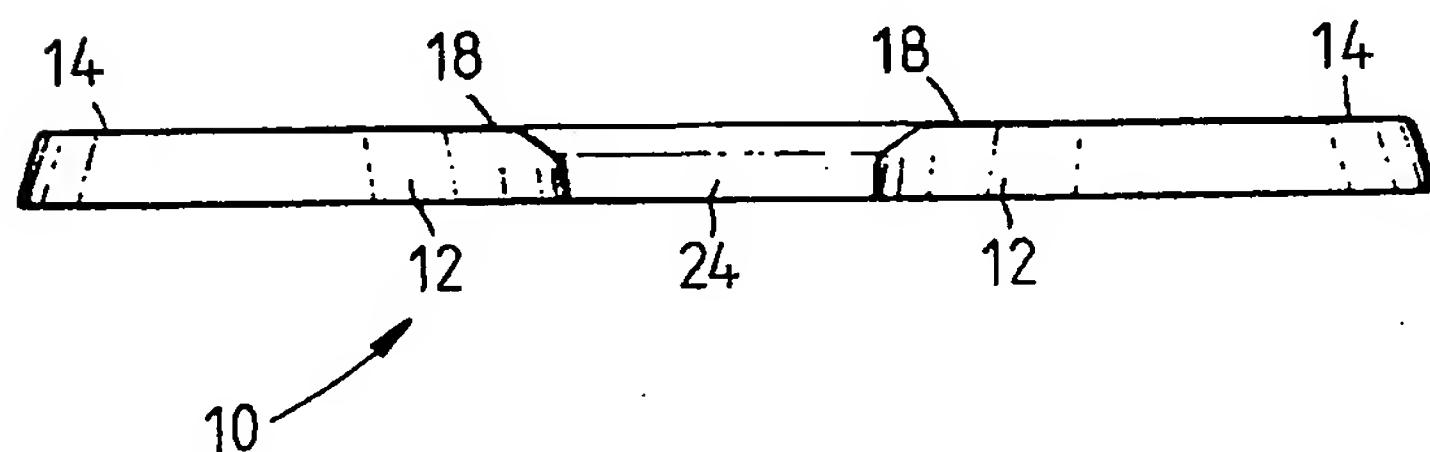
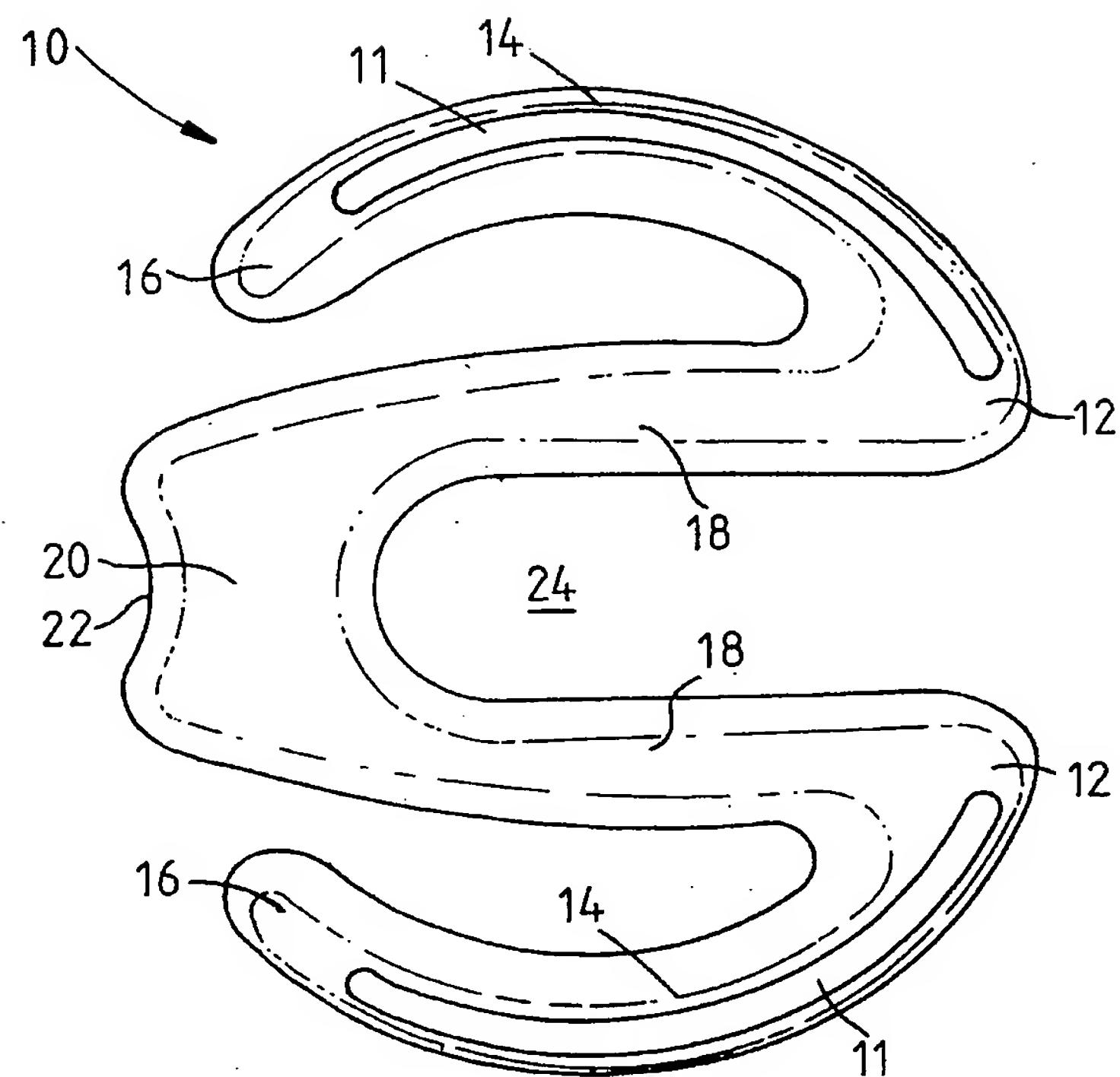
15 12. A horseshoe according to claim 11 wherein the frog portion extends rearwardly beyond said imaginary curved line by an amount in the range of about 5 to 20 mm.

13. A horseshoe according to claim 1 wherein the upper surface of the horseshoe is substantially flat.

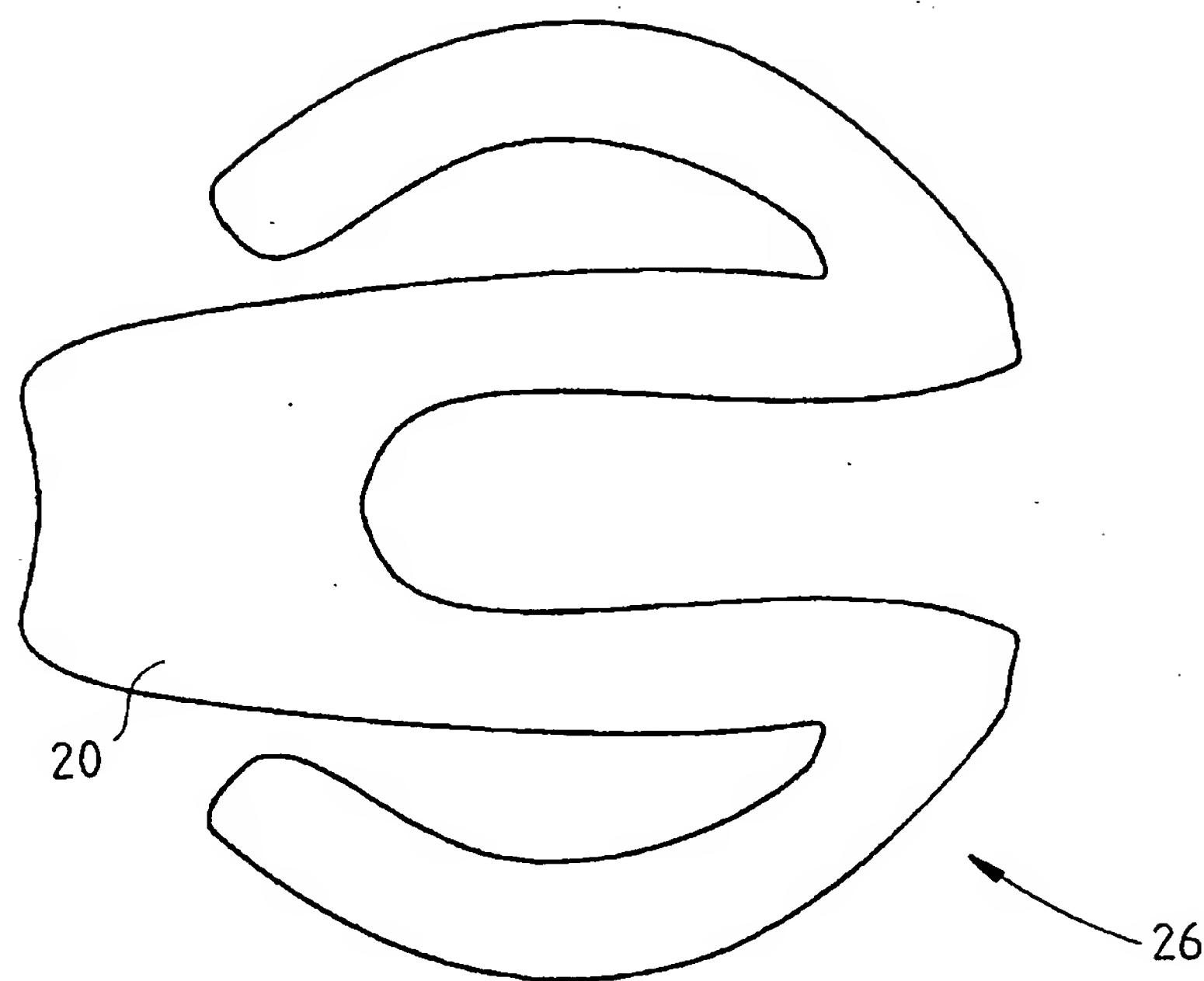
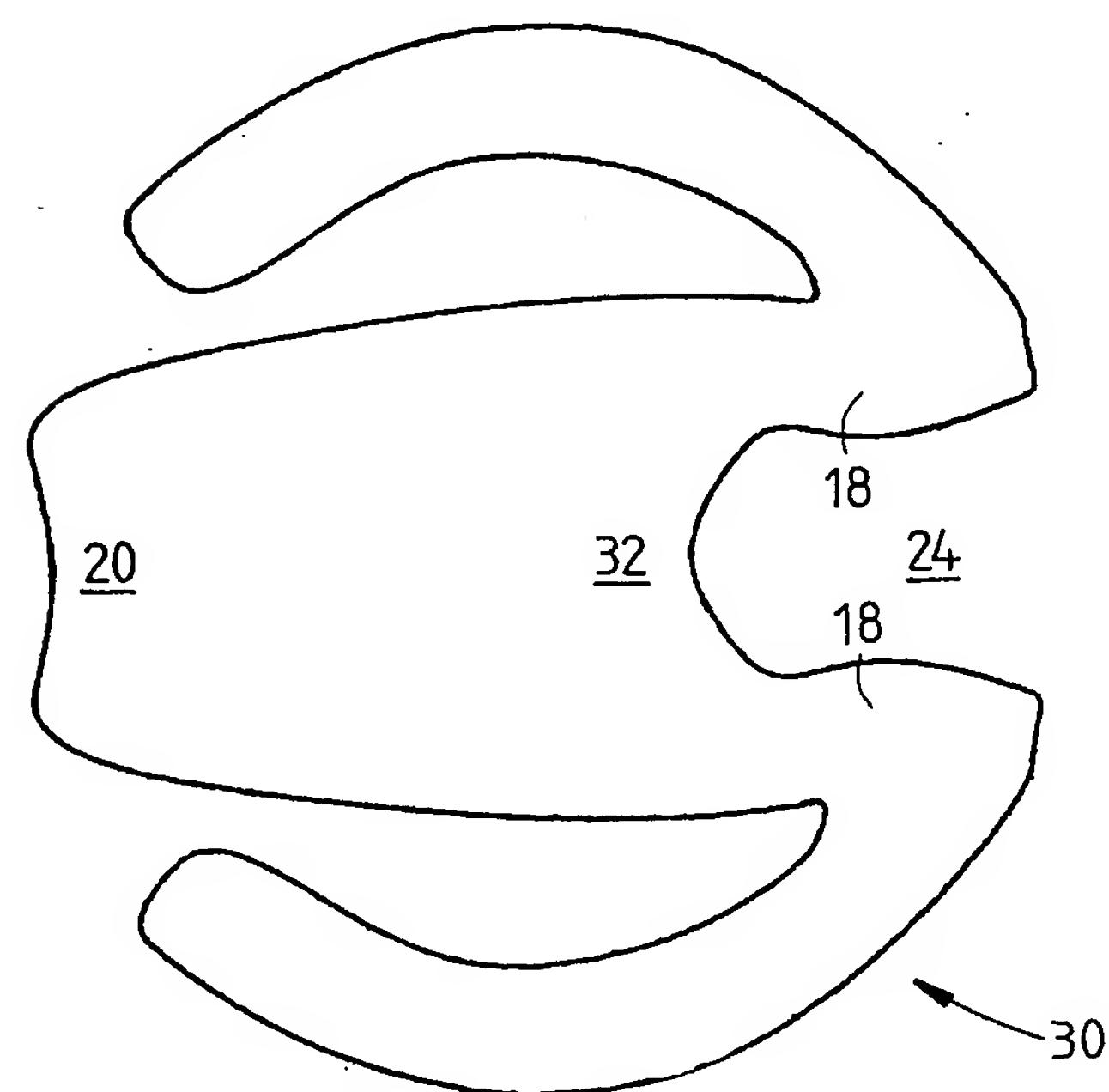
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14. A horseshoe according to claim 1 which is forged in aluminium or aluminium alloy.

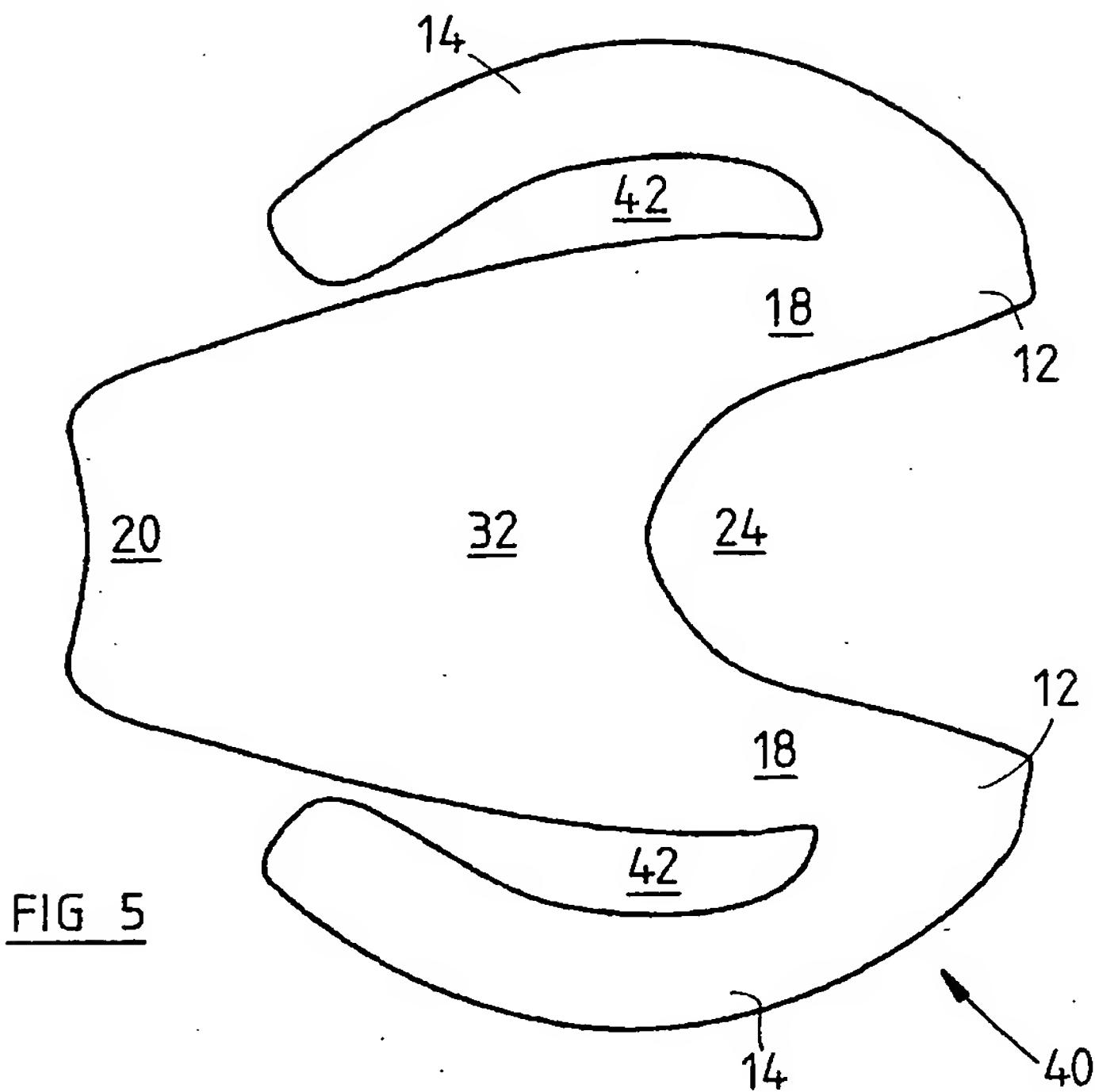
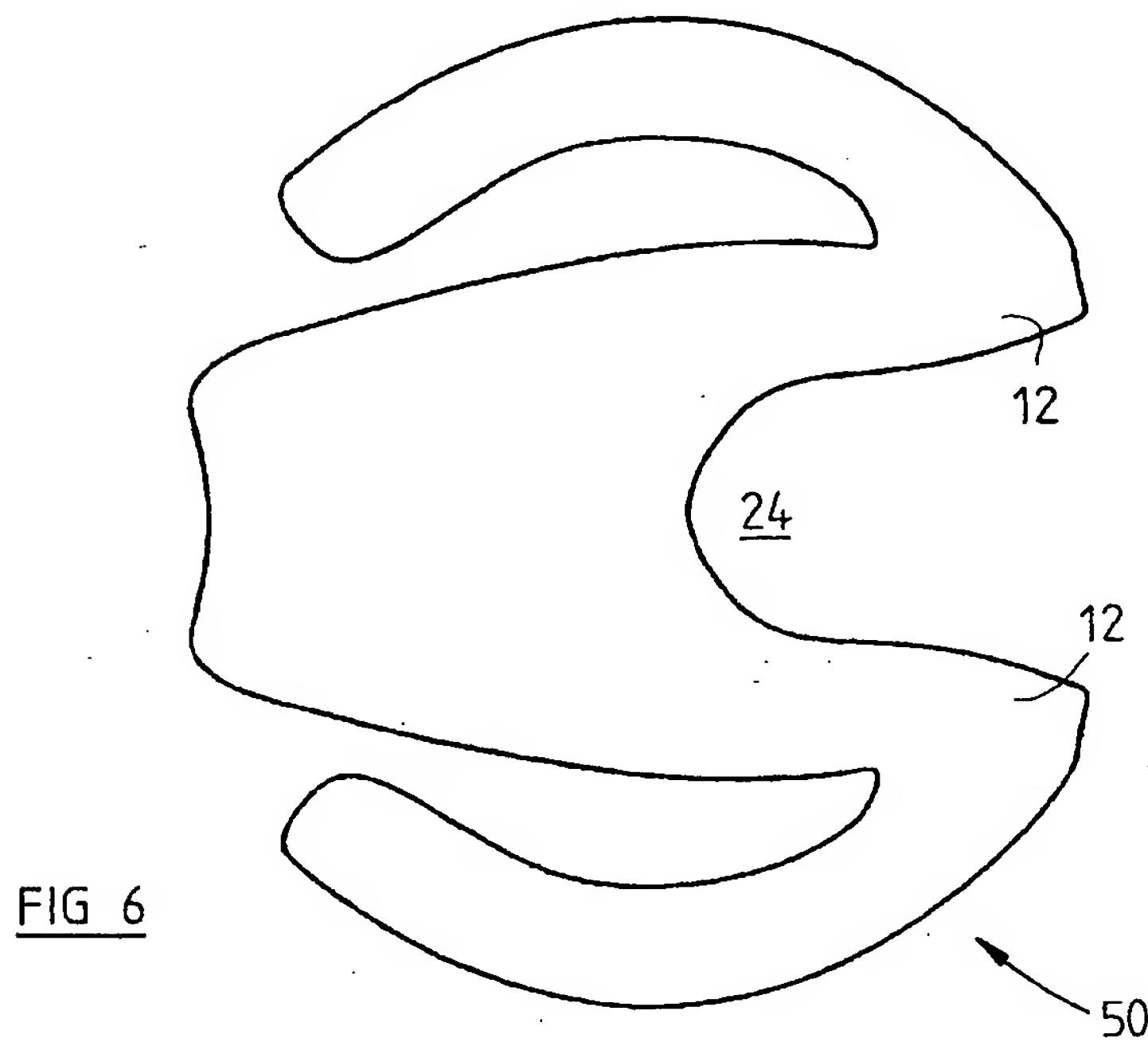
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FIG 1FIG 2

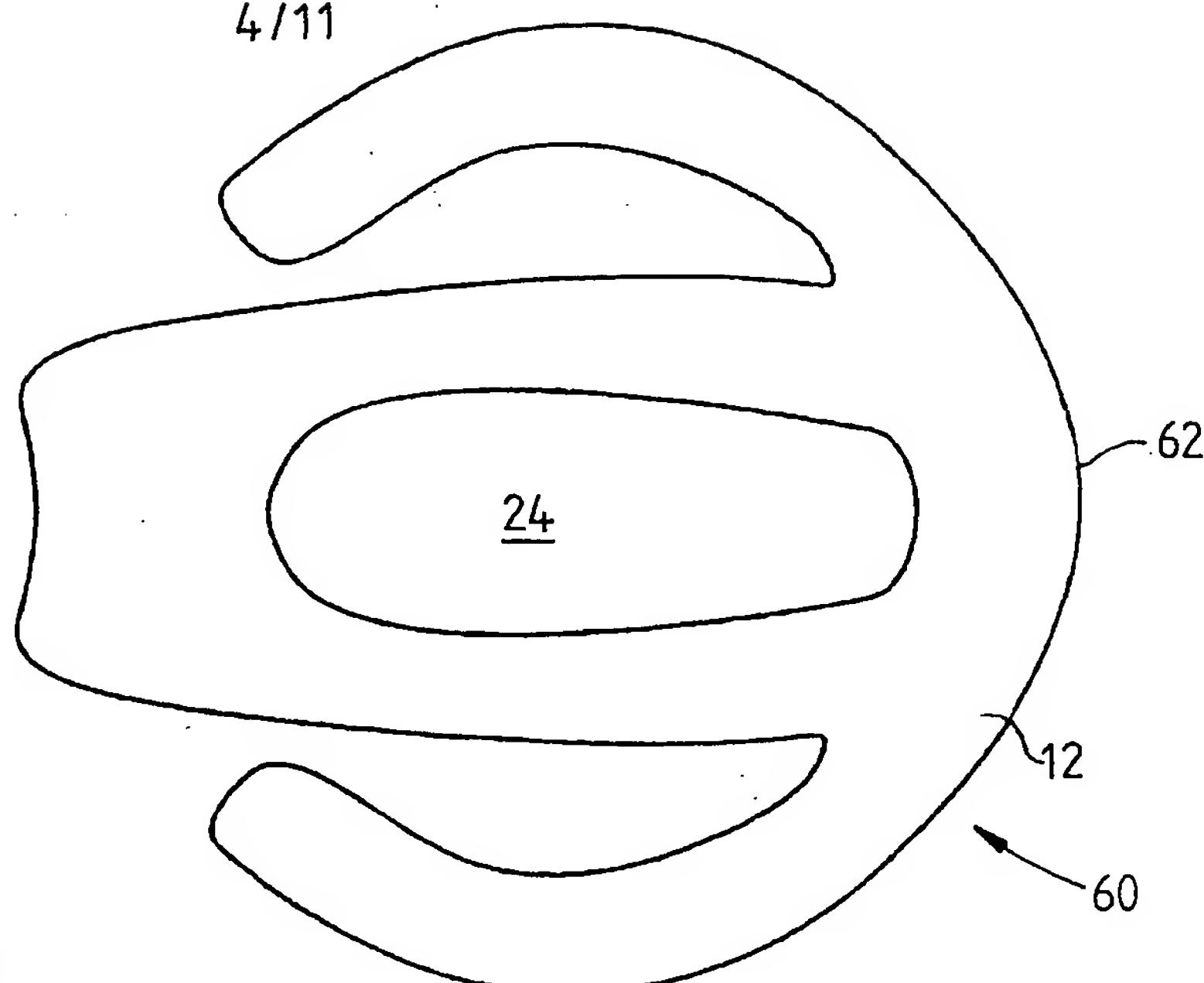
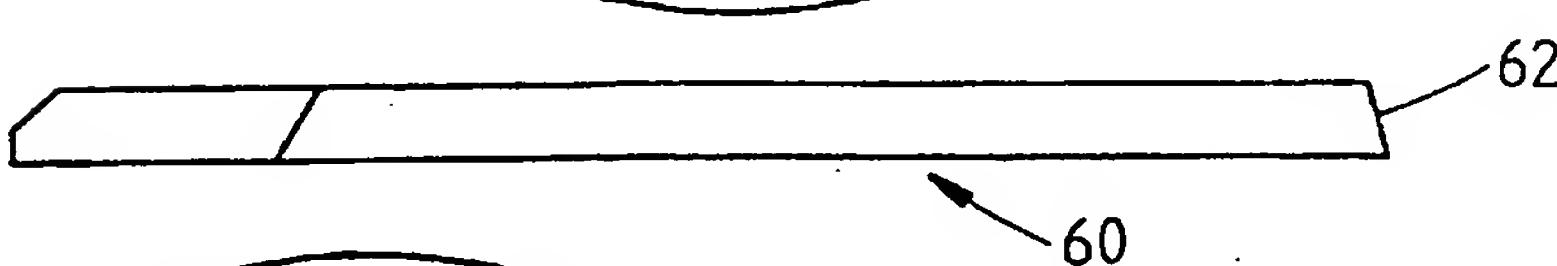
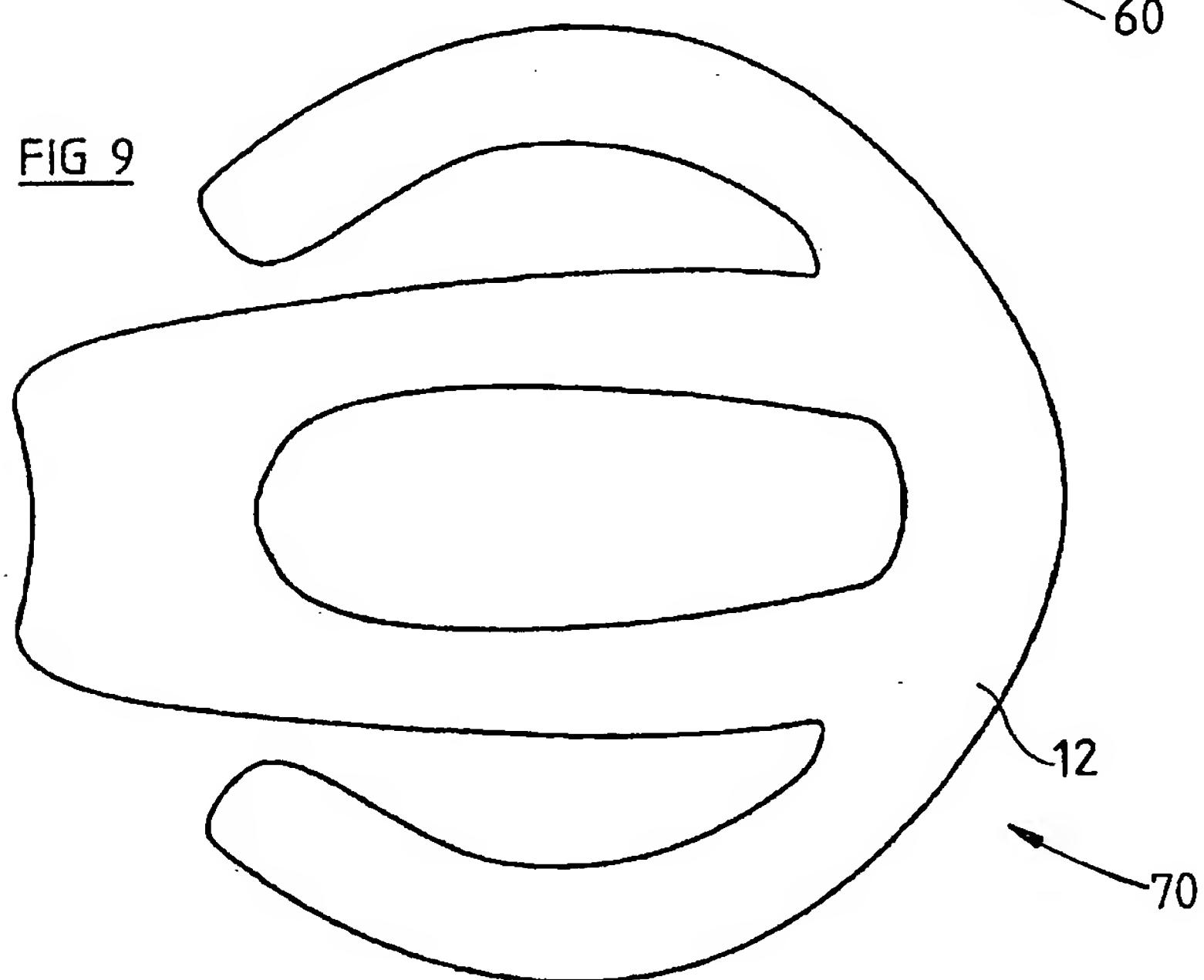
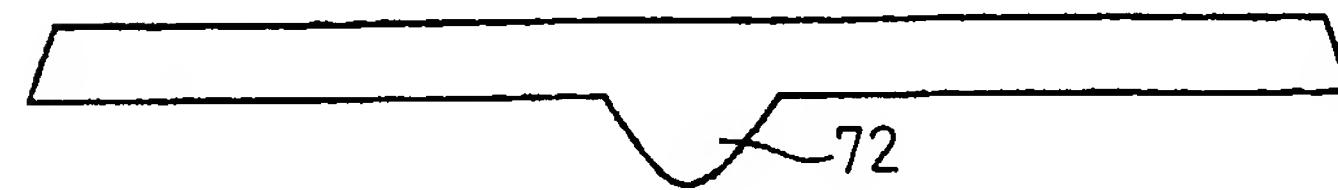
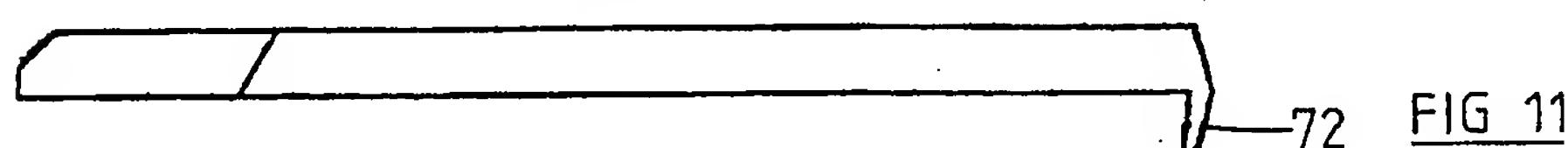
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FIG 3FIG 4

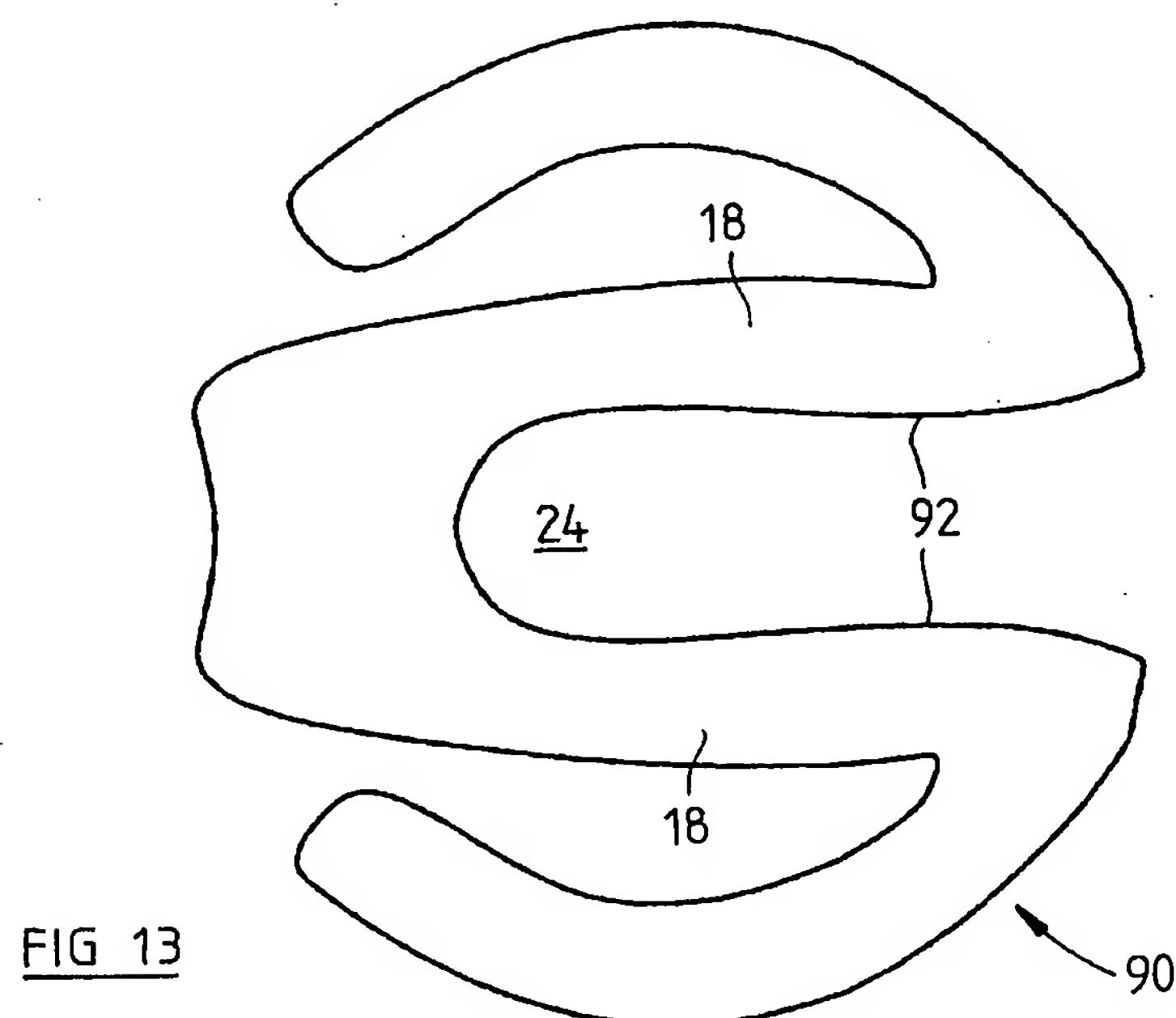
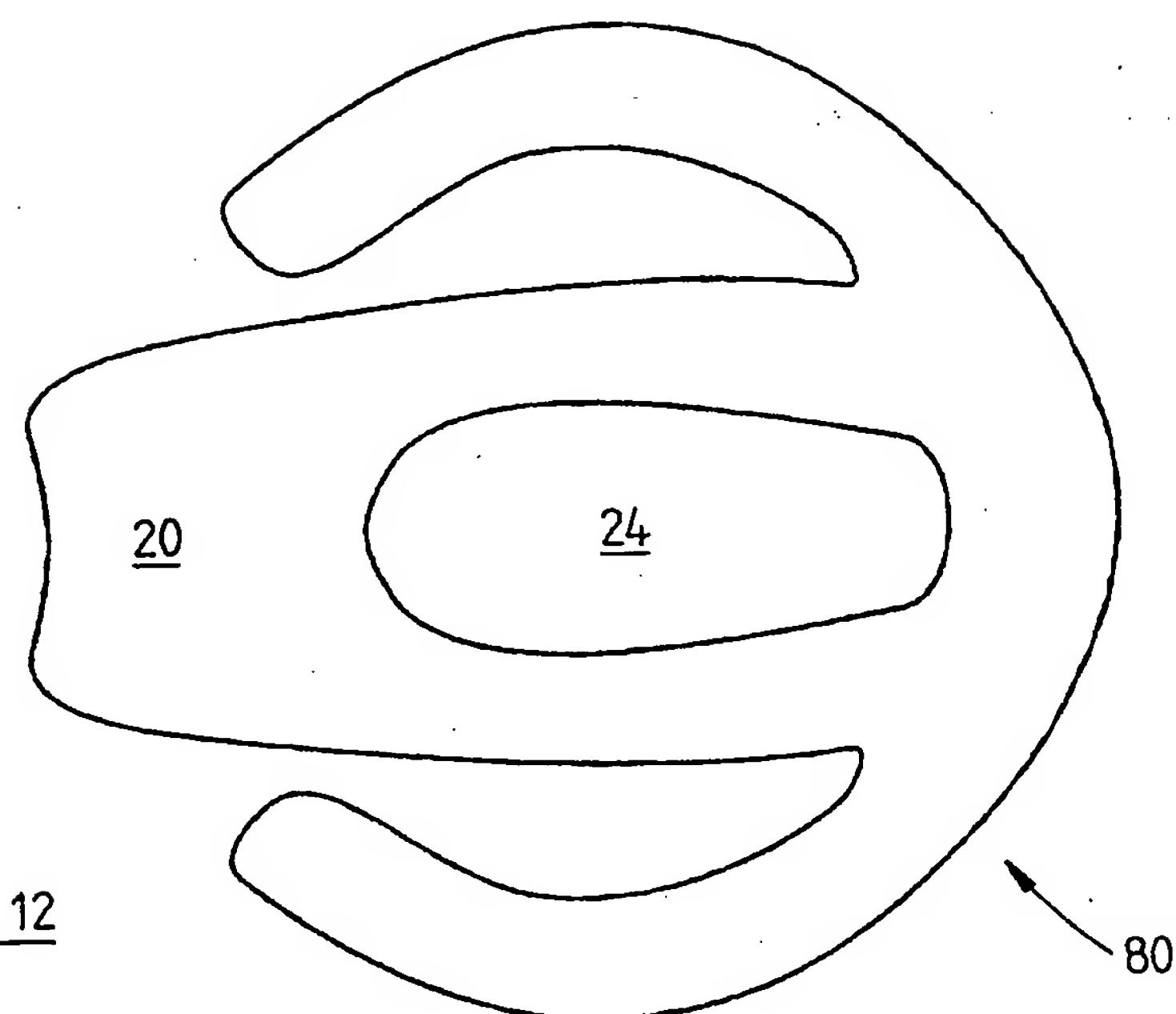
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FIG 5FIG 6

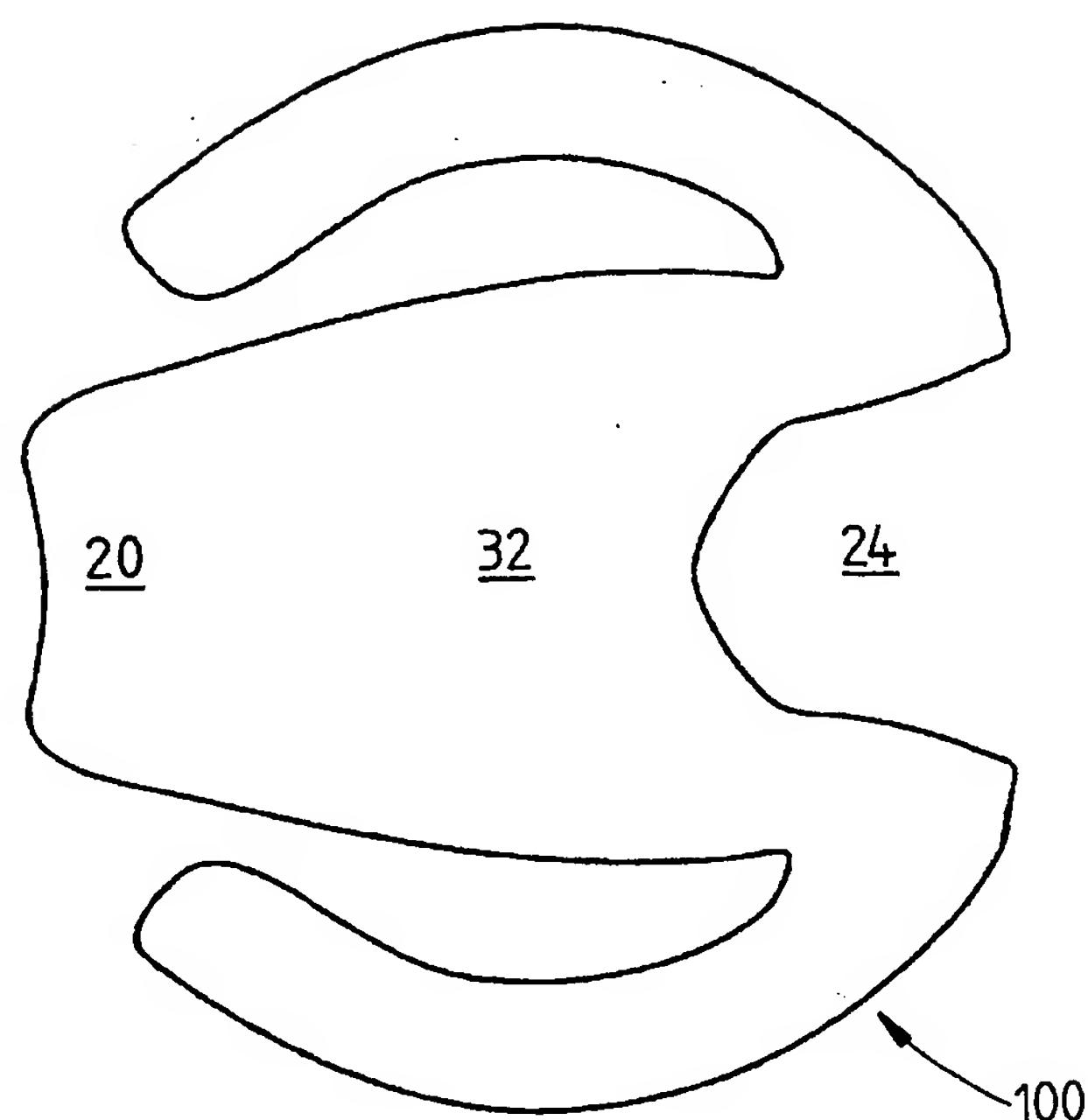
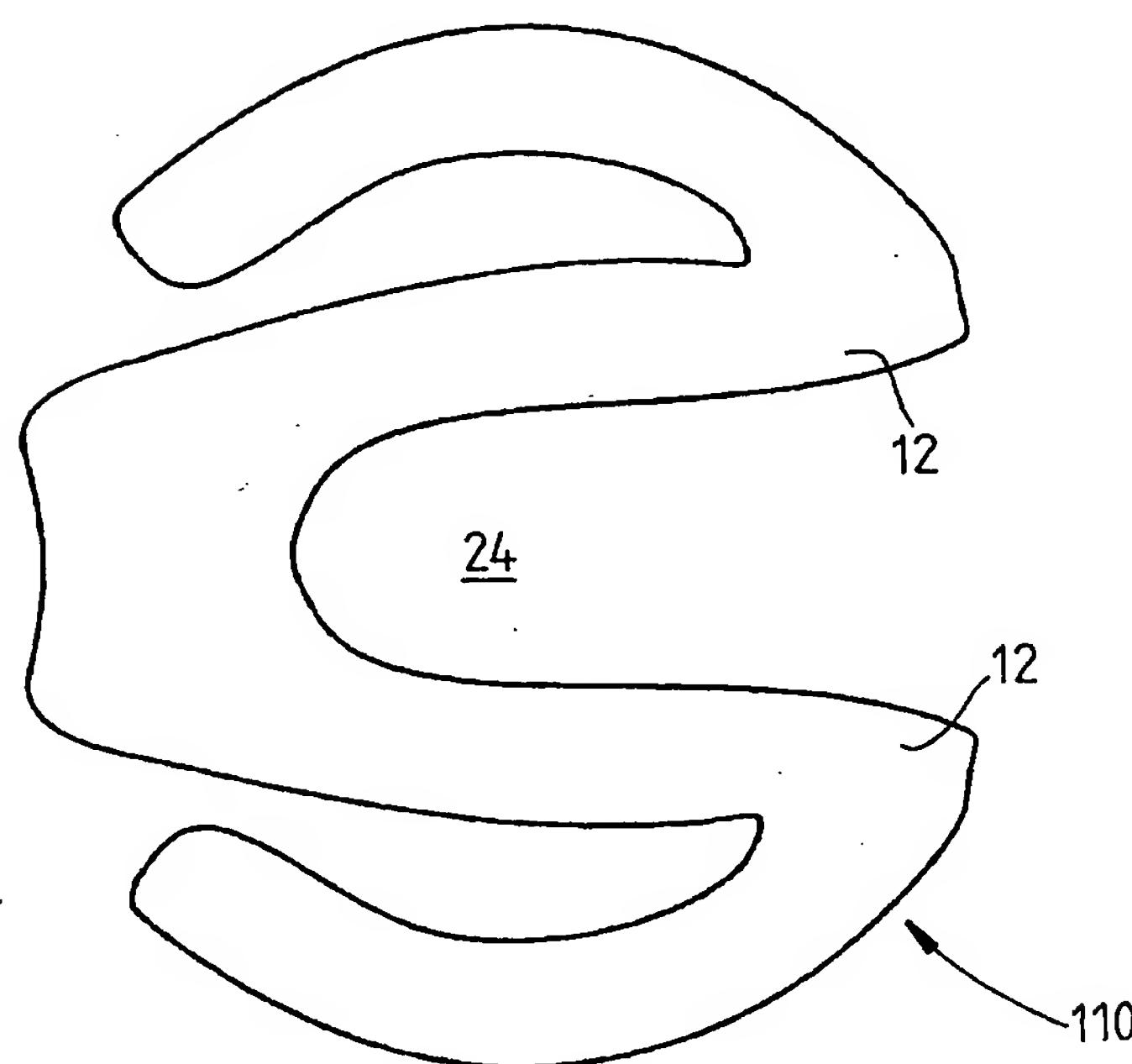
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FIG 7FIG 8FIG 9FIG 10FIG 11

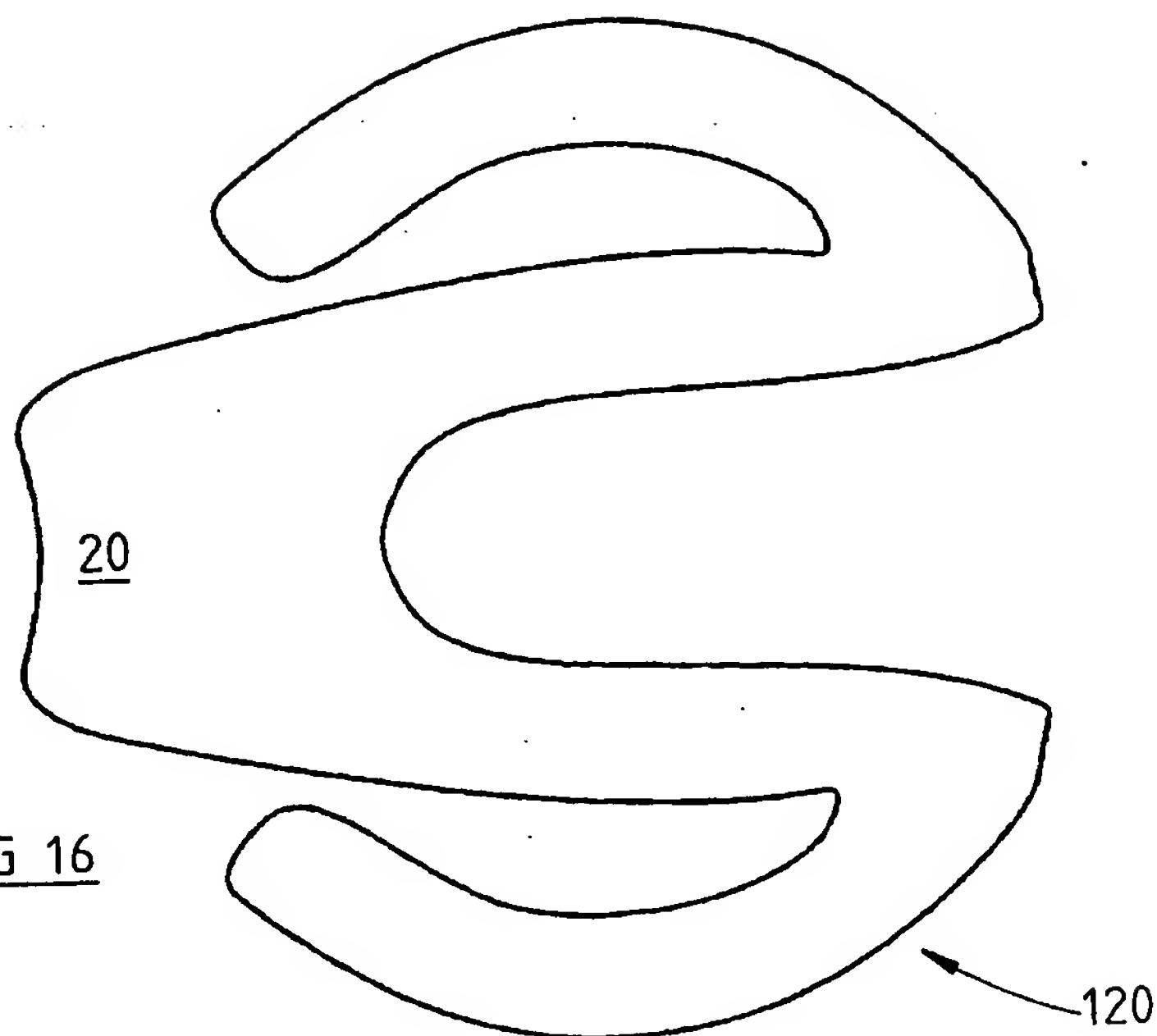
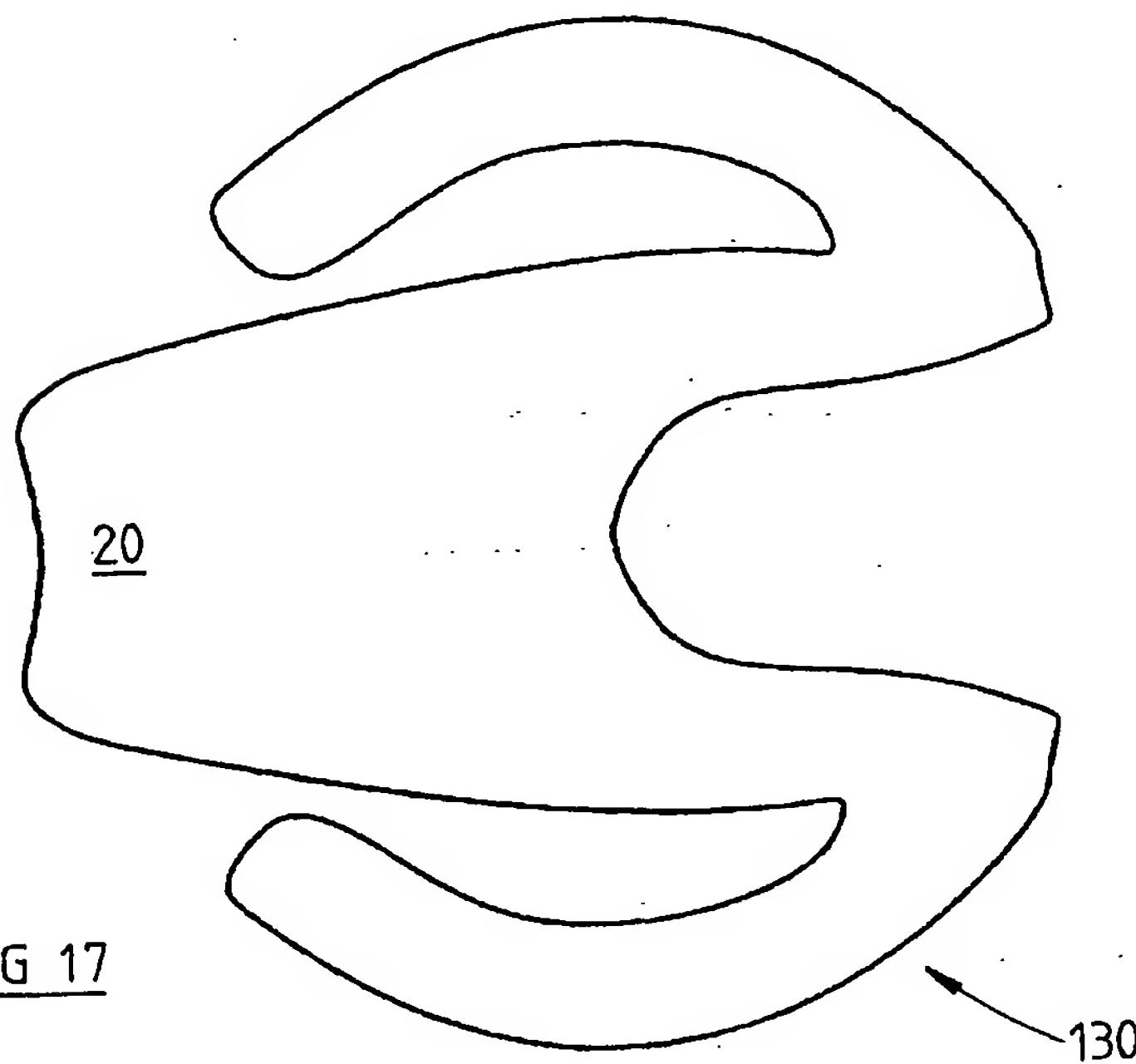
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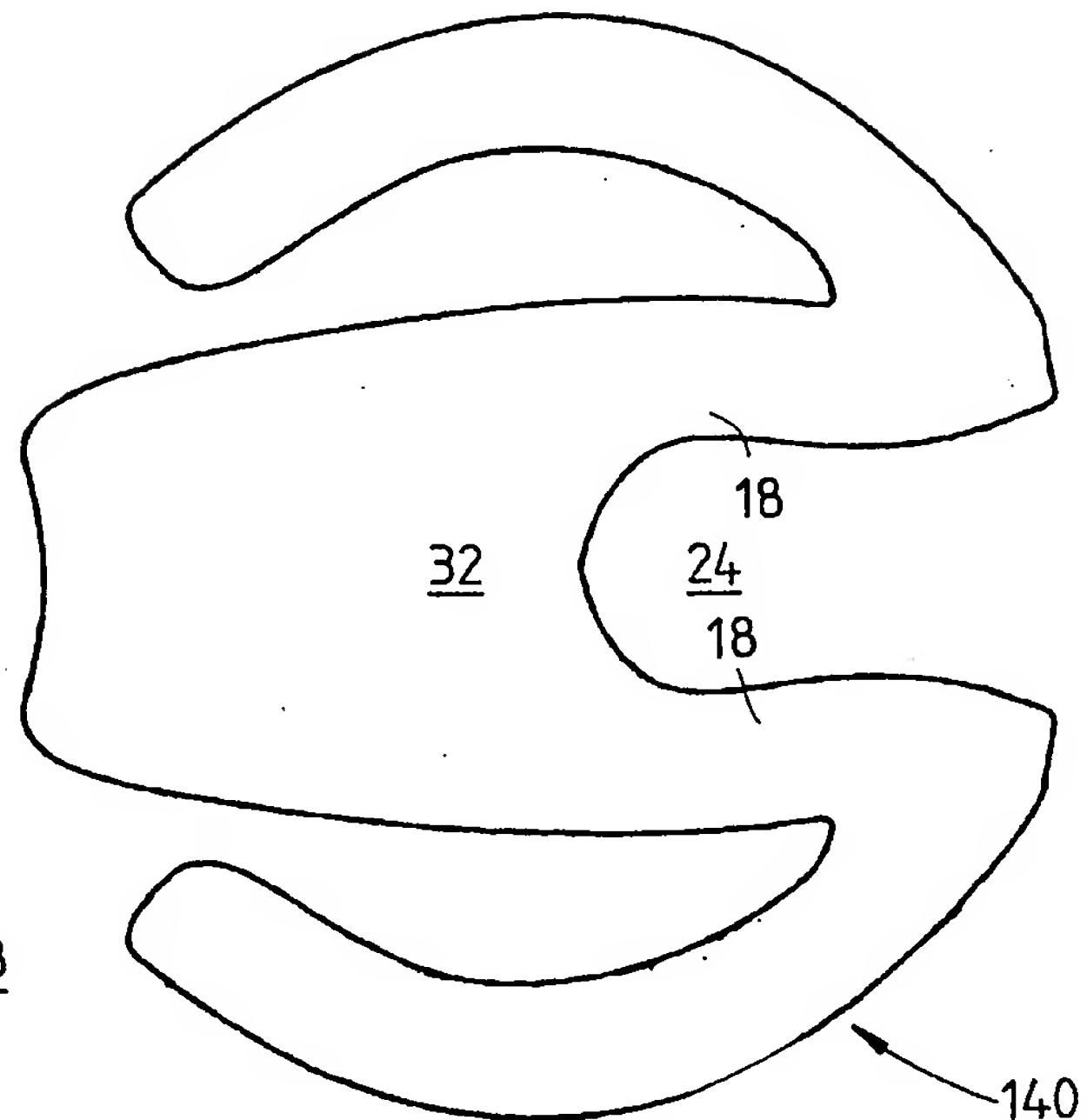
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FIG 14FIG 15

7/11

FIG 16FIG 17

8 / 11

FIG 18

14

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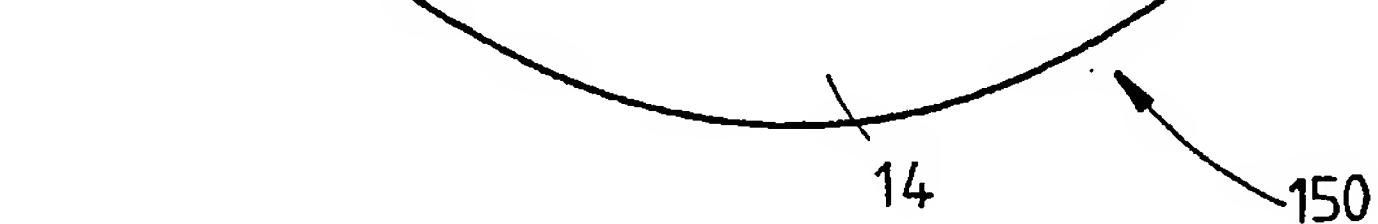
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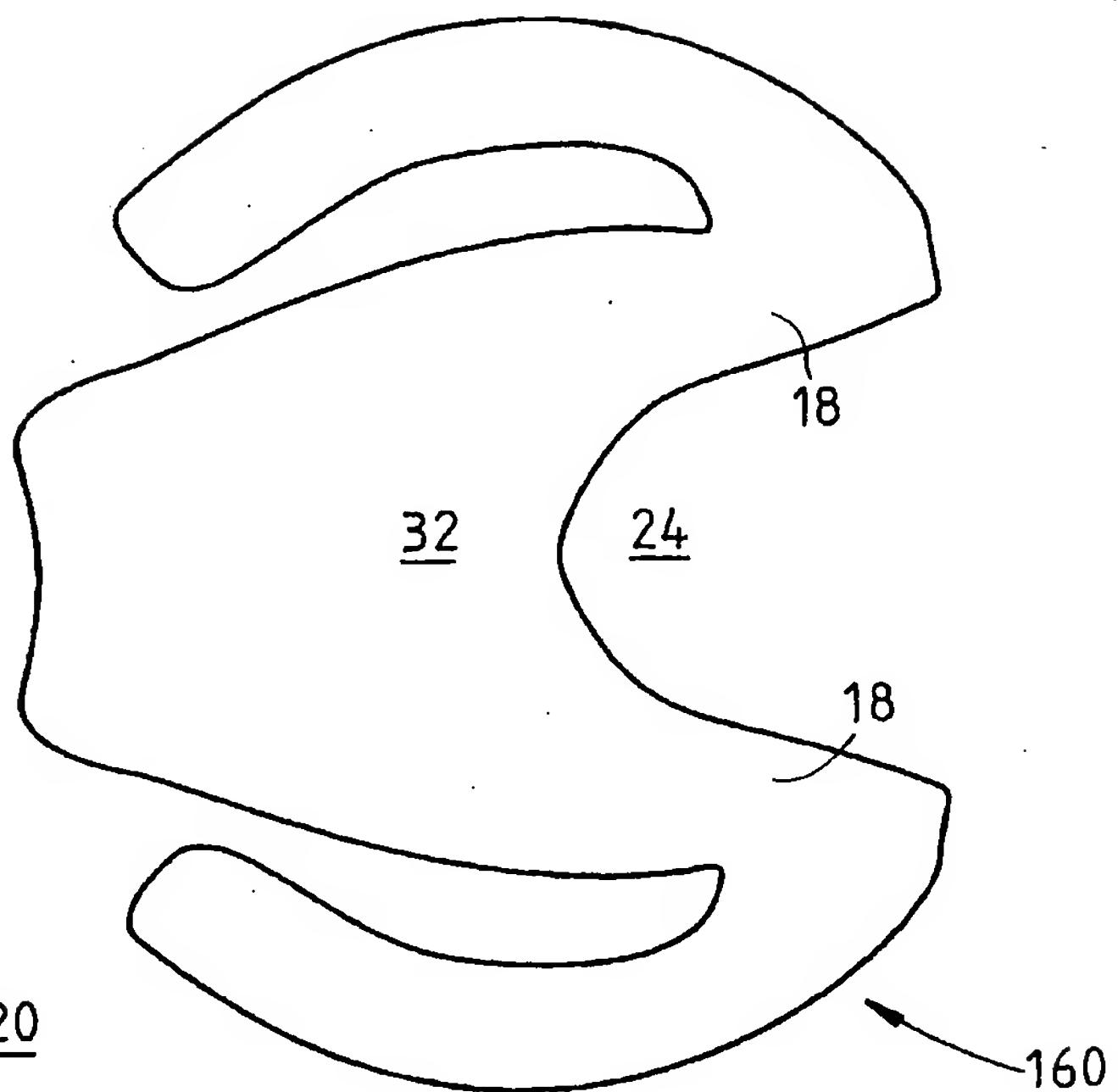
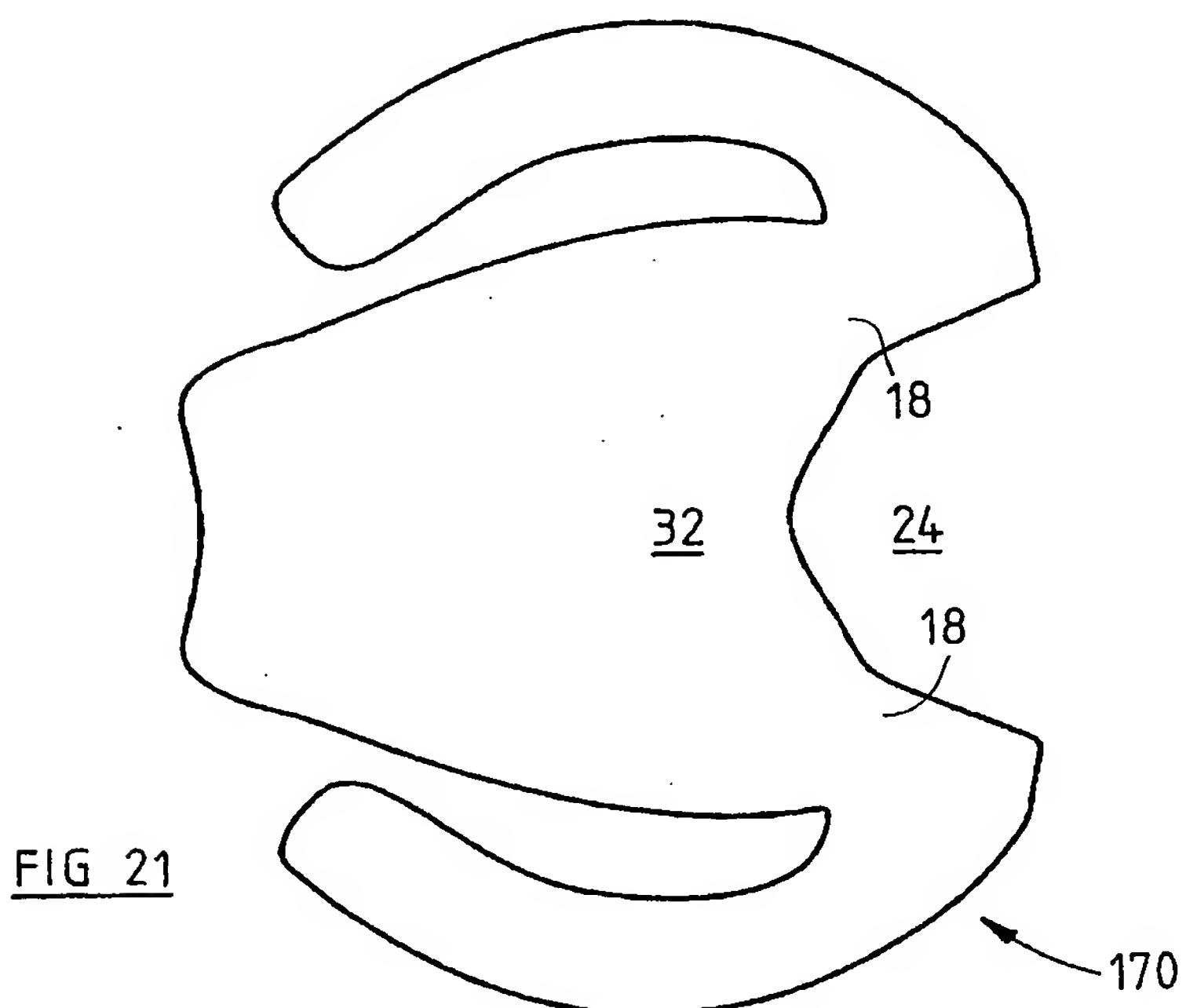
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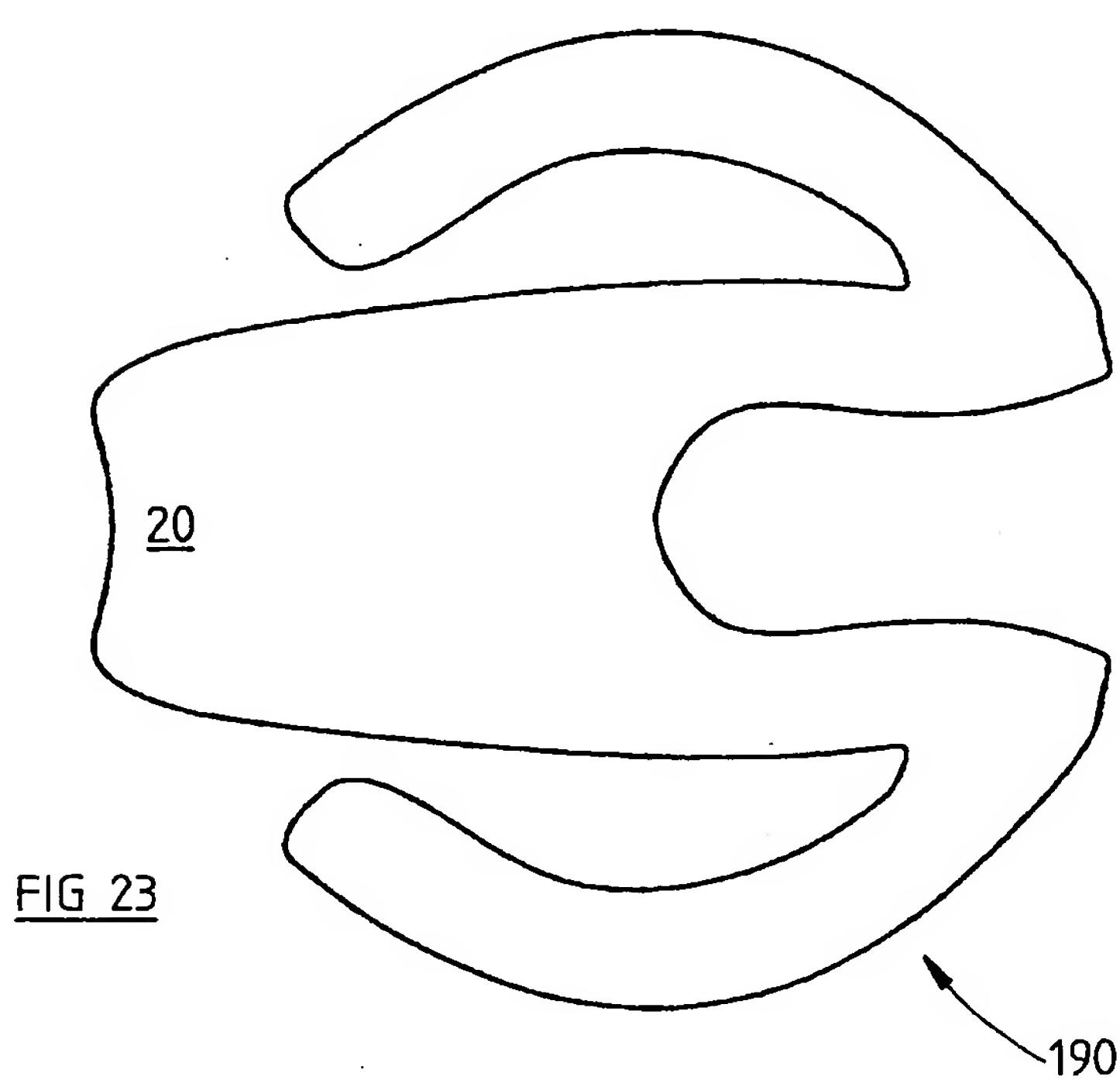
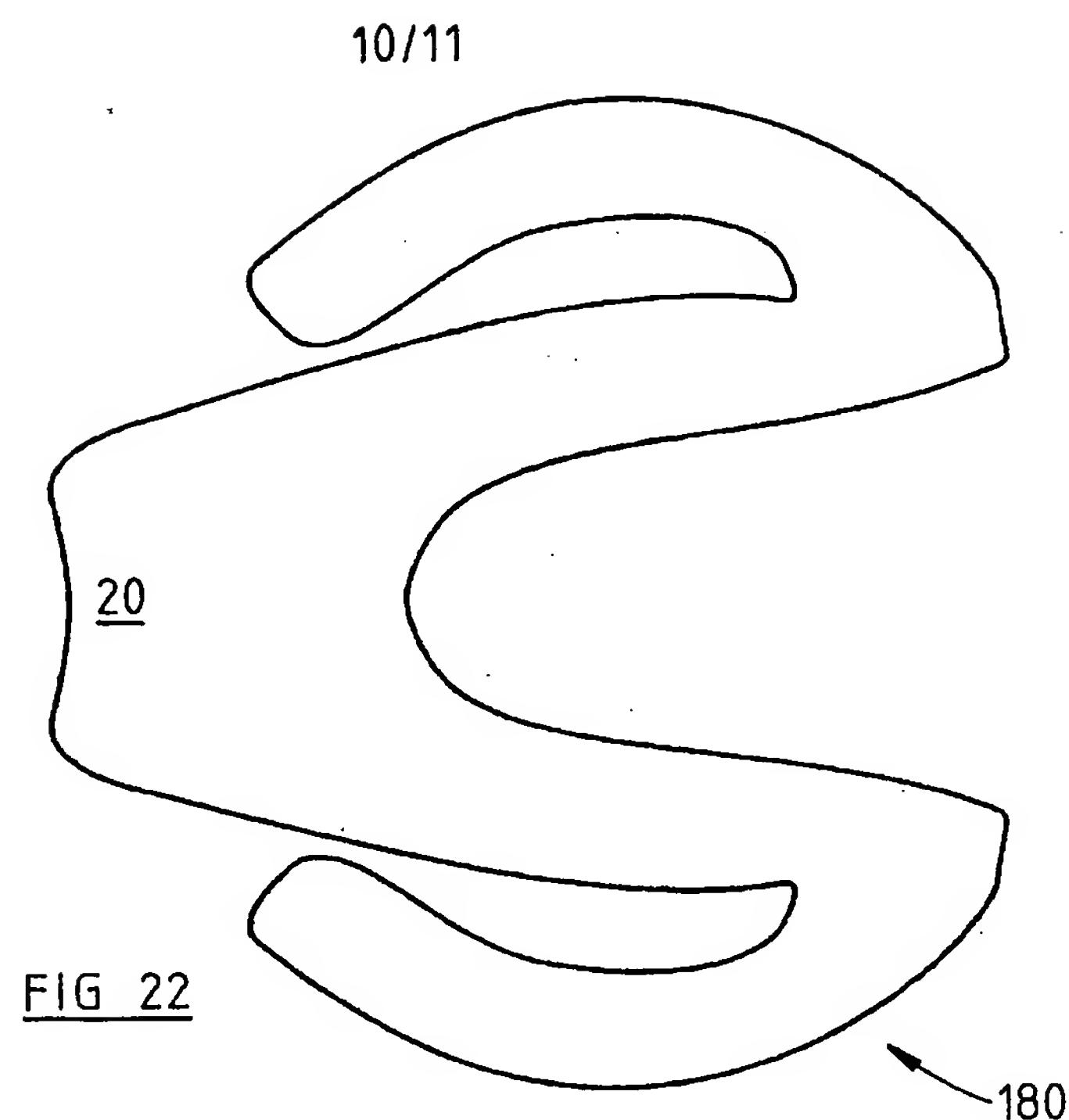
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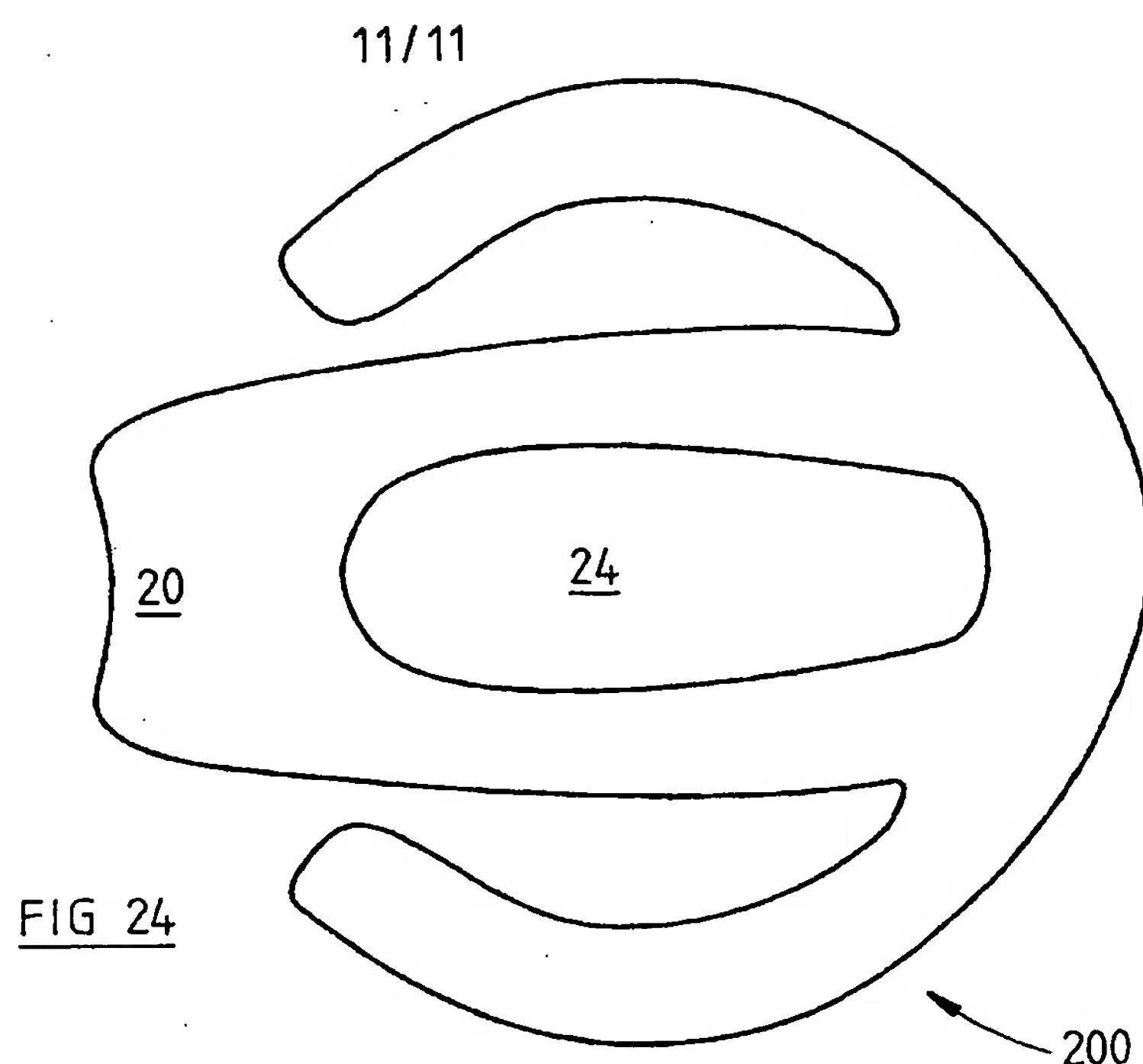
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FIG 19

9/11

FIG 20FIG 21





INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 98/00662
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A. CLASSIFICATION OF SUBJECT MATTER																						
Int Cl ⁶ : A01L 1/02, 3/02																						
According to International Patent Classification (IPC) or to both national classification and IPC																						
B. FIELDS SEARCHED																						
Minimum documentation searched (classification system followed by classification symbols) IPC: A01L 1/00, 1/02, 3/00, 3/02, 5/00																						
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above; Registered Designs in Class 30-99																						
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT: IPC as above without keywords																						
C. DOCUMENTS CONSIDERED TO BE RELEVANT																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																				
X	FR 2040538 A (ALLETRUX) 02 April 1969 Whole document	1-9, 13, 14																				
X	DE 383284 A (BÖRRÖCZ) 12 October 1923 Whole document	1-10, 13, 14																				
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